The various types of vaccine which have been used in the patient and such measures as will produce protein shock have all served a purpose. They give the patient at least a "new deal" and either by improving the general circulation by vasomotor relaxation or by promoting antibody reactions tend to bring about general improvement. Whether we agree with the authors that the local disturbance in the joint is brought about by an allergic state, or whether there is some other immunological principle involved, it does seem at times that specific vaccines have a definite value. It seems quite certain that there is some general metabolic disturbance, using the term in its broadest sense, which is back of this group of conditions. I do not think that we have yet determined the fundamental process which is involved, but we are nearer to the solution than we have ever been in the past.

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Fred H. Kruse, M. D. (384 Post Street, San Francisco).—Doctor Strietmann's work has interested me chiefly in its relation to the therapy of chronic arthritis. The voluminous literature that has appeared and is appearing on the classification, etiology, and treatment of the arthritides is sufficient evidence of the difficulties we are encountering and of our failure in controlling this disease.

I still think that we must proceed rather radically in the elimination of focal infections in every part of the body; but when that is done there will yet remain epithelial tissues and lymph structures in the nasal sinuses, throat, lungs, genito-urinary system and gastro-intestinal tract that harbor and disseminate organisms that undoubtedly continue to invade the joints. Further surgical eradication is impossible, but the many specific immunological factors, disordered metabolic and internal glandular functions that determine and control our resistance to infections offer a fertile and intriguing field for speculation and attack. Doctor Strietmann has indicated the possibilities that may result in raising the specific resistance powers of the individual. Doctor Kerr has suggested the importance of studying the general constitutional needs. Of the latter, the glandular dystrophies and obesities; the influence of heredity; the diet in relation to the protein and vitamin needs of the individual and his ability to metabolize carbohydrates and eliminate glucose must all be taken into consideration. In association with the work of Doctor Strietmann in his use of specific vaccines from the intestinal tract, it is interesting to compare the report of H. Warren Crowe in the August issue of *The Journal of Laboratory and Clinical Medicine* in reference to his isolation of certain strains of streptococci and the so-called *"Micrococcus deformans"* from stools and other surface foci of the body, and the excellent results obtained in the use of vaccines containing these organisms.

It is evident from the immunological side of this problem, then, in the light of Strietmann's and Crowe's reports, that vaccines have more than the accredited protein shock value—a real specific value if the actual pathogenic organisms can be isolated. To secure the proper organisms is difficult and requires the procedures described by the authors.

The problem of the intestinal tract plagues us all. I have consistently felt that mere colonic irrigations, high or low, with or without acidophilus implantations by tube, could never do more than afford temporary improvement and that if the intestine actually causes arthritis, a more specific method of treatment must be evolved.

The viewpoint of Crowe that the offending organisms are harbored in the small intestine and must be secured from there further complicates the problem. Pemberton has described unusual conditions of the intestinal tract which are present in the course of chronic arthritis and often precede it. He notes this condition especially in the colon as seen by x-ray, consisting of elongation, widening, tortuosity, and inertia of that organ. Fletcher has claimed that the bowel may be returned to a normal condition by dietary control, including curtailment of the carbohydrate intake, adequate ingestion of protein, and a large vitamin content. Catharsis as so generally practiced frequently defeats its own aims and leaves only an irritated and inflamed mucous membrane, from which greater absorption takes place. By more gradual and natural measures with the proper diet, adequate elimination and improved bowel tonus can be attained with a minimum of toxic absorption.

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Doctor Strietmann (Closing).—Whether one believes that focal infections are the direct cause of arthritis or that indirectly by disturbing the normal metabolism they lower resistance and are predisposing, at present our attitude should be in favor of the removal of any frank focus as the first step in the treatment of arthritis. One may still argue whether disease is the precursor of bacteria appearing in the body tissues or the reverse, but their unquestioned presence calls for removal where feasible.

There is not much doubt that chronic infections exhaust the thyroid and probably the suprarenals, and there is an apparently definite type of climacteric arthritis. One should, therefore, always bear in mind the glandular dystrophies and disordered states of metabolism and use all means to correct them.

I, too, question the value of colonic irrigations. In fact, it is not improbable that they may do harm by increasing absorption. The "enema rash" (and cathartic rash) are an evidence of this.

Another matter to be pointed out in relation to both the allergic skin diseases and the allergic conception of arthritis is the danger of depleting the patient by the drastic so-called "elimination diets." It is not reasonable to assume that an individual who has eaten certain foods all his life suddenly becomes sensitive to them. However, one may conceive that some protein split products may develop as the result of deficient digestion, or even bacterial overdigestion, to which the patient may be sensitive. Similarly, as a result of changed intestinal environment, new strains of bacteria may develop to which *per se* the body is unaccustomed and sensitive. In either of the two latter premises, fecal vaccines, developed according to the Wherry method, may prove a valuable aid.

RETROBULBAR NEURITIS AND MULTIPLE SCLEROSIS

SOME OBSERVATIONS WITH QUANTITATIVE CHARTS AND REPORT OF CASE

PART I

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Discussion *by Dohrmann K. Pischel, M. D., San Francisco; M. F. Weymann, Los Angeles.*

DOUBTLESS many ophthalmologists have read and reread with sharply focused and perhaps startled attention the following lines in a recent masterly contribution by Professor Harvey Cushing[1]: "Somewhat to his embarrassment it is the ophthalmologist who must make the final decision between a possible intranasal or a possible intracranial primary cause of an existent optic atrophy." And still further, "What we must all strive for is to avoid futile operation either on the part of the neurosurgeon, or on the part of the rhinologist." Ophthalmologists may have been all attention at this point, but how many were prepared for this exquisite addition: "Unquestionably misdirected procedures would less often be carried out if the ophthalmologist took it on himself not only to make the decision, but to put it to the test by conducting his own intracranial and

intranasal explorations rather than turn them over to others."

What more stimulating comment could be more deftly presented to the ophthalmologist, and from what higher court? While the ophthalmologist may feel flattered by the latter part of the above paragraph, still there was "embarrassment" to begin with. Embarrassment is the right word. Large series of these cases must be slowly accumulated and carefully studied before relief from this embarrassment will come.

It is only occasionally that a conscientious, path-finding enthusiastic surgeon finds it necessary to turn to his followers—often more radically enthusiastic than their leader—and endeavor to curtail the train of operations that he has so laboriously started. Perhaps the splendid work of Leon White was as striking as any recent instance of this tendency for a surgical pendulum to overswing its equilibrium point. Indeed we may be even now reaching a state of overconservatism as the reaction against certain spheno-ethmoidal aërations becomes more pronounced.

PURPOSE OF THIS PAPER

The purpose of the observations in this paper is to emphasize again [3] what seems to be one of the most important steps in arriving at a better equilibrium in the retrobulbar neuritis group. I refer to the careful recording of a series of visual fields to establish the characteristics of progression by the consistent, perhaps daily, use of quantitative perimetry. To be sure, this is a time-consuming examination, but I doubt not that if it can be shown to be more informing than rapidly made fundus, roentgen ray, transillumination, or nasal examinations, then time will be found to do the work even after office hours or in the evening, since artificial illumination may be used quite satisfactorily. A brief outline of some of the anatomical data should add breadth to viewpoints of the neurological ophthalmologist.[4]

ANATOMICAL DATA

Embryologic Development:

1. The ethmoid capsule is first formed solid without cells by a deposition of cartilage in the epithelium and subjacent mesenchyme, probably derived from the septum.

2. At certain, somewhat variable, points in the mucosa:

(*a*) The cells begin to divide more rapidly and pouch inward, thus forming the ostia.

(*b*) The variable location of the ostia, which determines to a large extent the location and variable arrangement of the cells of the sinuses.

(*c*) The primitive cells are first formed outside of the cartilaginous capsule.

(*d*) The mucosa lining these cells has a marked ability to stimulate absorption of, and to evaginate into cartilage, bone and even dura, enabling the cells to grow or pneumatize into the capsule, etc., though as late as the third year they may be still extracapsular in the ethmoid region. Each sinus cell should have a nonvalvular opening into the nose.

3. Osseous centers appear in the cartilage in the fifth and sixth fetal months and tend to protect nervous and vascular tissue first, with a denser cortical deposit. (Ossification is not complete until adolescence.)

4. Osteoclasts aid the mucosa in the process of invasion or pneumatization of the sinuses. A weakness on the part of osteoblasts in protecting the foramina and other important structures, or an overactivity on the part of osteoclasts or mucosa, results in weak spots or dehiscences in the covering of important structures.[5]

The search for an explanation of certain cases of retrobulbar neuritis stimulated the investigation of the formation of occurrence of these dehiscences. Possibly their discovery in various and unexpectedly wide distribution led to an overemphasis of their importance in that explanation. At any rate it seems notable that in the majority of dehiscent cases found in the dissecting room no history of trouble of the sort to be expected is obtained. Then again, of the few cases of retrobulbar neuritis cases that have come to autopsy, dehiscences have not been actually found in sufficient proportion to lay as much to their door as might be convenient. Albeit the presence of a definite interstitial inflammation in the substance of the optic nerve has been sometimes found to exist, even though the optic disk appeared to be within the limits of normal in appearance, yet in others no pathological change is noted in the nerve even after a central scotoma has existed for as long as three months.[6]

However possible, it seems to state that few who have dehiscences have retrobulbar neuritis and again that dehiscences have rarely been found in retrobulbar neuritis cases. Yet it must be remembered that it is a difficult subject on which to gather statistics because even when it is possible to get an ordinary autopsy on a retrobulbar neuritis case, the search for dehiscences requires such a devastating, expert dissection that, for cosmetic reasons, it is not often permitted. While we are waiting for the slow accumulation of such evidence it is well to make note of the following possibilities as disclosed in the dissecting rooms:

Sphenoidal Dehiscences:

Such have been found to occur in sinus extensions to:

1. Hypophysis and brain stem—pons and basilar artery.
2. Dural side of cavernous sinus and contents (int. carotid).
3. Optic chiasm and hypophysis.
4. Vidian nerve and nasopharynx (eustachian tube); in pterygoid extension.
5. Gasserian ganglion, maxillary nerve at foramen rotundum and mandibular nerve at foramen ovale; in great wing extension.
6. Superior orbital or sphenoidal fissure extension may reach: second (optic n.), third (superior and inferior division of oculomotor n.), fourth (trochlear n.), fifth (frontal n.—lachrymal and nasal branches), sixth (abducens n.).

The optic canal has a bony wall of thickness normally varying from 0.2 to 2.0 millimeters and

is commonly from 2.0 to 5.0 millimeters distant from the osteum of the sphenoidal sinus. Dehiscences may vary from pin-point in size to a complete surrounding of the nerve so that it runs free in the sinus.

Ethmoidal Dehiscences:

May occur in extensions to:

1. Meckel's ganglion.
2. Orbital plate.
3. Dural plate.
4. Maxillary sinus.
5. Frontal sinus.
6. Lachrymal sac (dehiscences are most common).
7. Optic nerve at the foramen (where it is normally coated by 2.0 to 5.0 millimeters of bone is much better protected than at the sphenoidal sinus).

STIGMATA OF MULTIPLE SCLEROSIS

In addition to keeping these possibilities in mind it is just as essential to keep in mind some of the main stigmata of that most interesting and variable disease, multiple sclerosis. We must be particularly concerned about this disease since it is estimated that optic atrophy occurs in 50 per cent of the cases, often abruptly enough to be readily confused with retrobulbar neuritis.

Multiple Sclerosis:

1. Possibly of infectious origin. Often confused with hysteria, paralysis agitans, Friedreich's ataxia, or Meniere's disease, as well as with retrobulbar neuritis.
2. Optic atrophy in 50 per cent of the cases,[7] and may begin in early life.
3. Intention tremor.
4. Nystagmus.
5. Scanning speech.
6. Remissions are quite common.
7. Bladder disturbances (late as a rule).
8. Vertigo (late as a rule).

Whether European clinics actually encounter multiple sclerosis more frequently than American clinics is difficult to say. Certainly, by reference to the extreme percentages, about twice as many cases are sifted out of the retrobulbar group and placed in the multiple sclerosis group in European clinics as are so classified in American clinics at present. For instance Sheerer[8] reports that 80 per cent of the retrobulbar neuritis cases in the Tübigen eye clinic (64,000 admissions in 1921 to 1928) were later classified as multiple sclerosis, 6 per cent as alcoholic, and 11 per cent unknown; 5 per cent represented relapses, leaving only 1½ to 3 per cent of retrobulbar neuritis from definite sinusitis. The next highest report is 66 per cent by Fleisher[9] from the same clinic in 1908. Then 54 per cent by Davis[10] in England, while Langenbeck and Tarle[11] both report about 25 per cent. This gives a general average of 50 per cent of retrobulbar neuritis representing multiple sclerosis. Thus we have: 50 per cent of optic atrophy in multiple sclerosis and 50 per cent of multiple sclerosis in retrobulbar neuritis.

REPORT OF CASE

When one finds a field such as the following in a patient who has rapidly lost vision, the few points already mentioned seem all too meager on which to take a stand as to whether or not operation shall be advised. Indeed the question seems usually to be presented with a feeling that a sinus operation should be done.

CASE 1.—Patient came under observation on October 12, 1928. Mrs. L. M., widow, age forty-three.

Complaint.—Blindness of right eye, first noticed when reaching for transfer ticket and widely missing it.

History.—Always had good health until her husband (a physician) died a year ago, when worry and work began to make her feel extremely tired. Two weeks ago one of her two children had the grippe and tonsillitis, and now her mother is sick with the grippe. Patient has kept up, but after a sixty-mile drive had such a feeling of malaise and grippe that she took a Turkish bath four days ago, and two days ago, although feeling better, the blindness O. D. was noted. Now, though tired, does not want to go to bed, but is much worried about her eyesight. No disease evident in sinus, by x-ray and nasal examination. Wassermann negative.

Eye Examination.—Vision, O. D., shadows only. Vision, O. S., 20/15. Fundi clear and within normal limits in all appearances. Disks good color, slightly rosy, left same as right. Venous pulsation noticeable on left disk. Not distinguishable in right eye. Fields: O. D., very large central scotoma with a border of weak peripheral vision. Color vision nil. O. S., close to normal except for a rather large blind spot having a tendency to expand temporarily, testing with 1/2000 (Figs. 1 to 6).

Comment.—After the first field is taken in a case of this sort the ophthalmologist will usually be expected to decide for or against an intranasal operation. In the absence of positive findings, except abrupt central defect in the field, our decision was against operation and in favor of treatment while searching for progressive changes in the field. The diagnosis rests principally between retrobulbar neuritis and multiple sclerosis. In the former the strong tendency to recover as soon as the worst stage is reached in a very high percentage (as high as 85 per cent given by Weill[12]) of the cases is well known. In the latter condition remissions are characteristic. Therefore a certain amount of watchful waiting and recording is justifiable. When a tendency to recover is detected the case can often be grouped among those which improve: with, in spite of, or without an operation.

The same may almost be said of treatment. Yet I have been so impressed with the recent work on virus infection[13] as a possible explanation, not only of retrobulbar neuritis, herpes, sympathetic ophthalmia, etc., but also of multiple sclerosis that I have used heavy doses of salicylates as advocated by Gifford for sympathetic disease, combined with nasal shrinkage and suction, with occasional normal saline irrigation. Rest in bed except perhaps for office examinations is urged. While these patients may recover without treatments, nevertheless treatment along these lines seems helpful not only to the morale of the patient during the panicky period, but also in maintaining the contact neces-

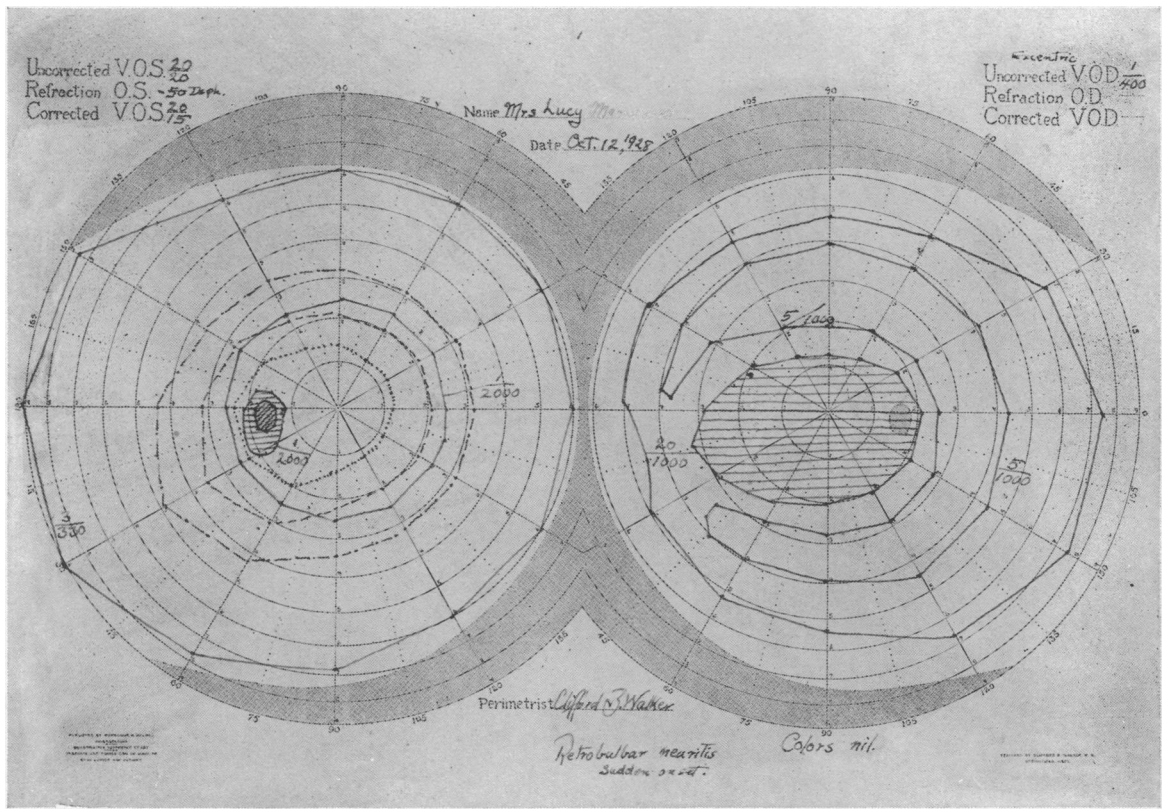

Fig. 1 (Case 1).—Retrobulbar neuritis, O. D. second day, very large central scotoma, color vision nil, bracelet field.

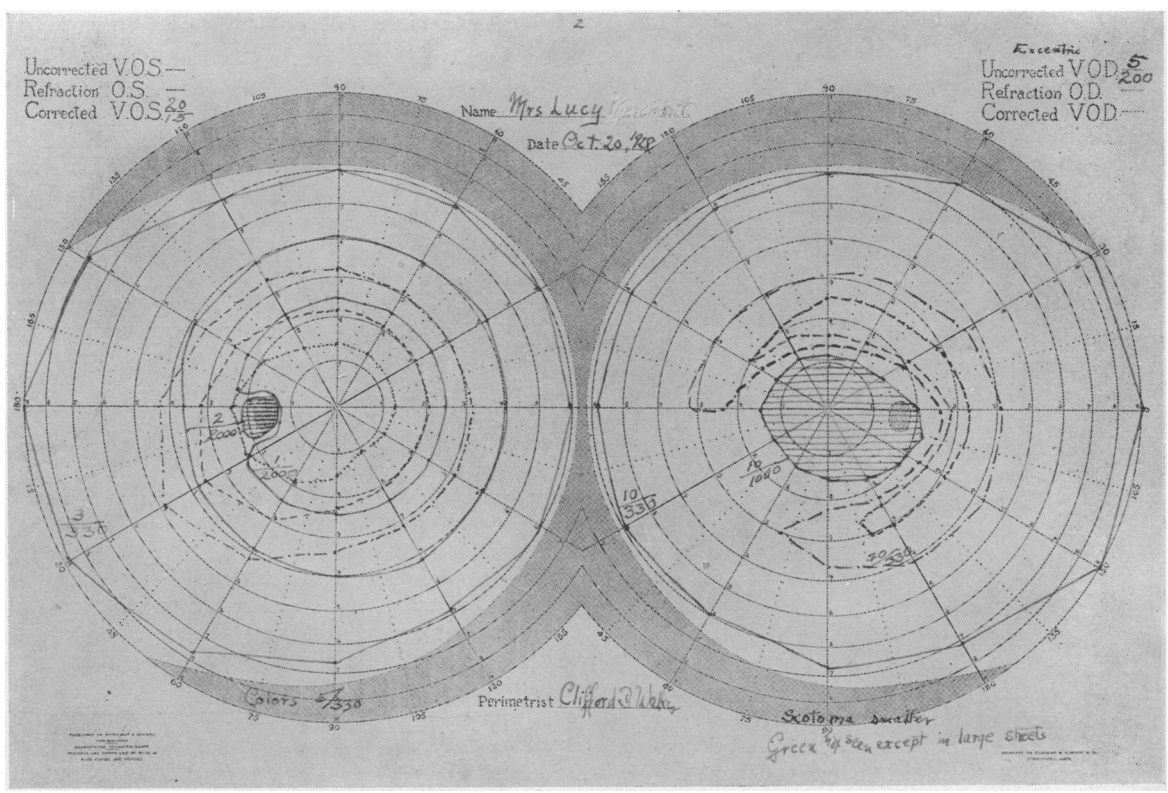

Fig. 2 (Case 1).—Retrobulbar neuritis, O. D. tenth day, scotoma shrinking, colors returning under treatment.

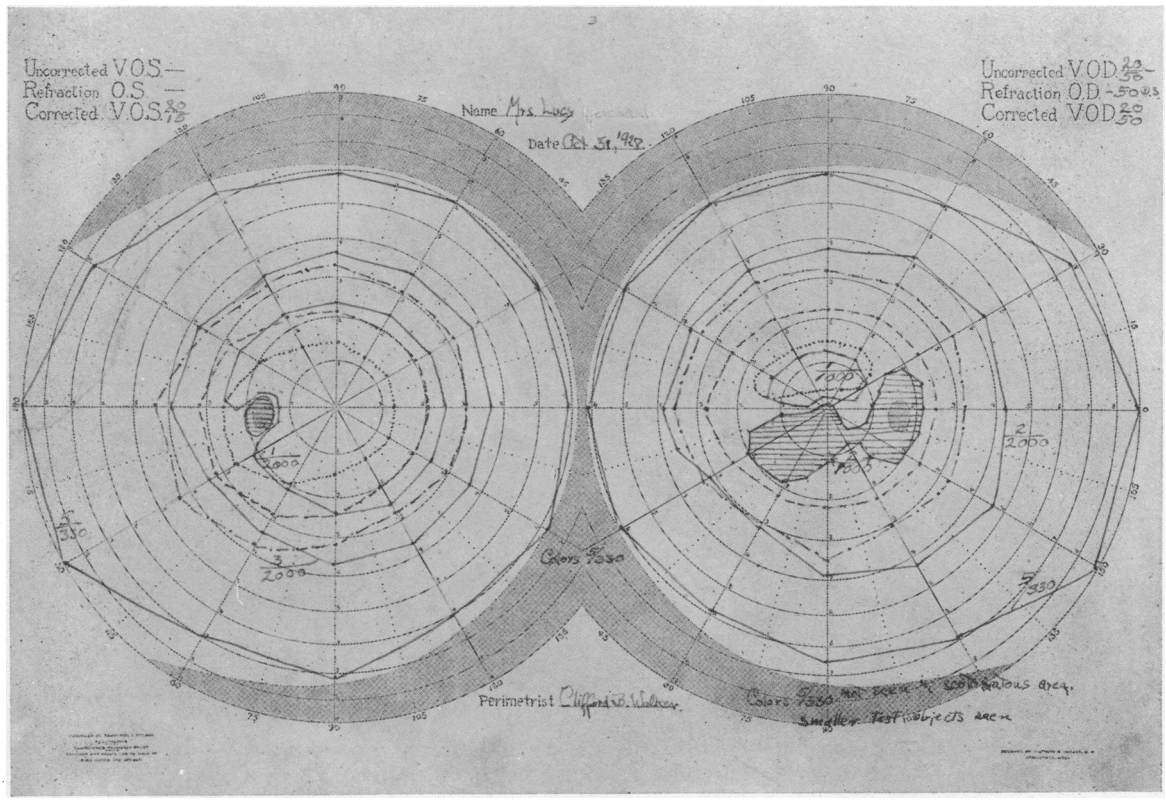

Fig. 3 (Case 1).—Retrobulbar neuritis, O. D. twentieth day, all colors represented. Accurate inferior cecocentral scotoma, "dumbbell."

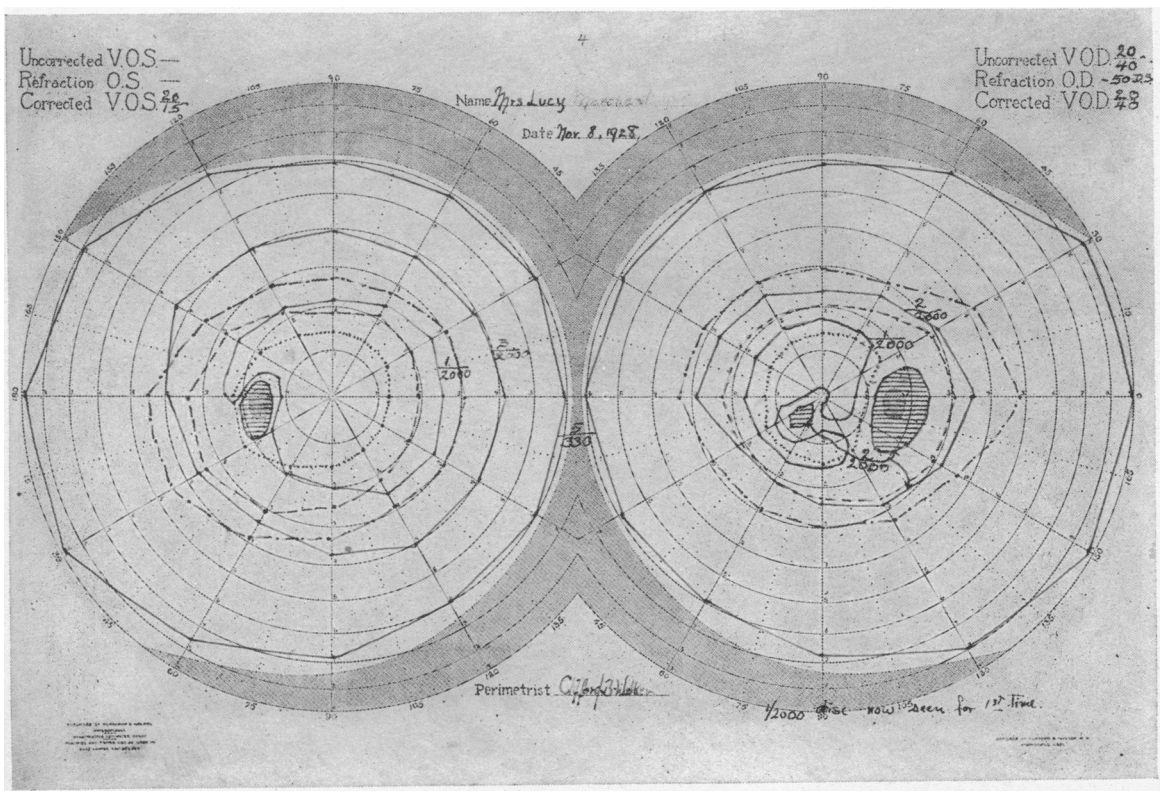

Fig. 4 (Case 1).—Retrobulbar neuritis, O. D. thirtieth day, further improvement, enlarged blind spot, infranasal paracentral scotoma.

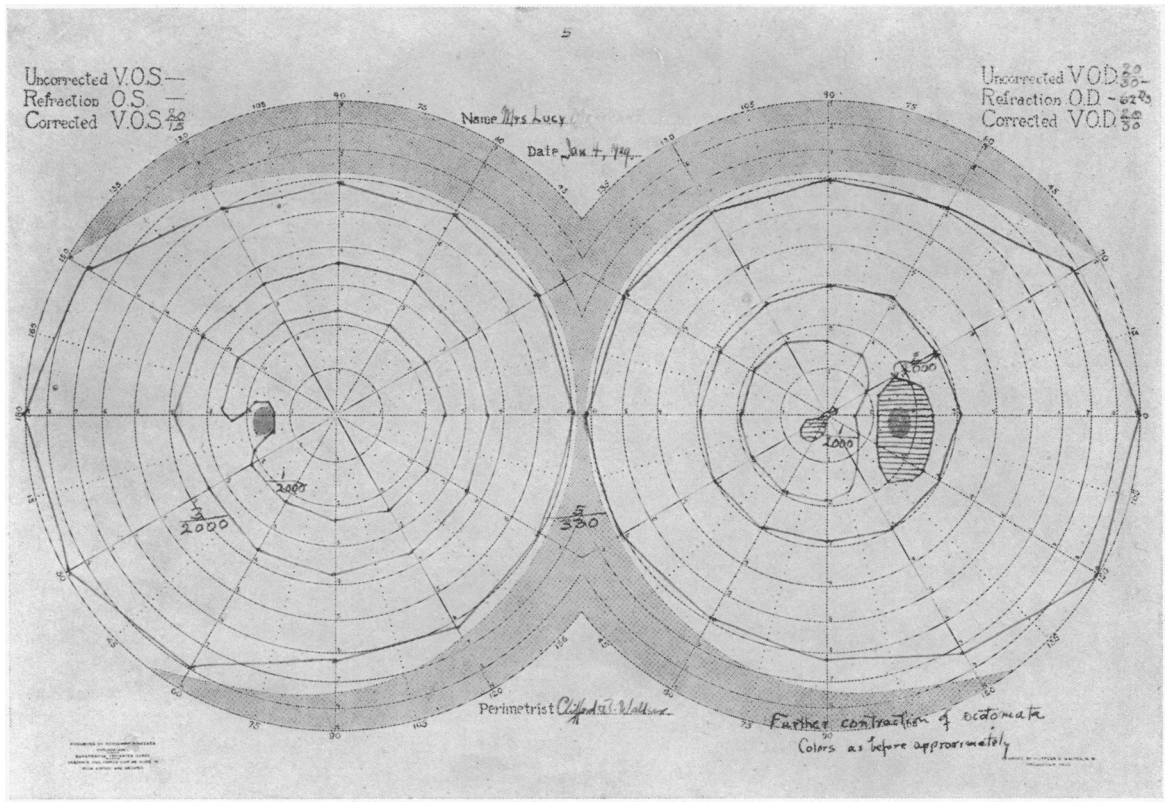

Fig. 5 (Case 1).—Retrobulbar neuritis, O. D. ninetieth day, form fields show still further improvement, scotoma only demonstrated with 1/2000 disk.

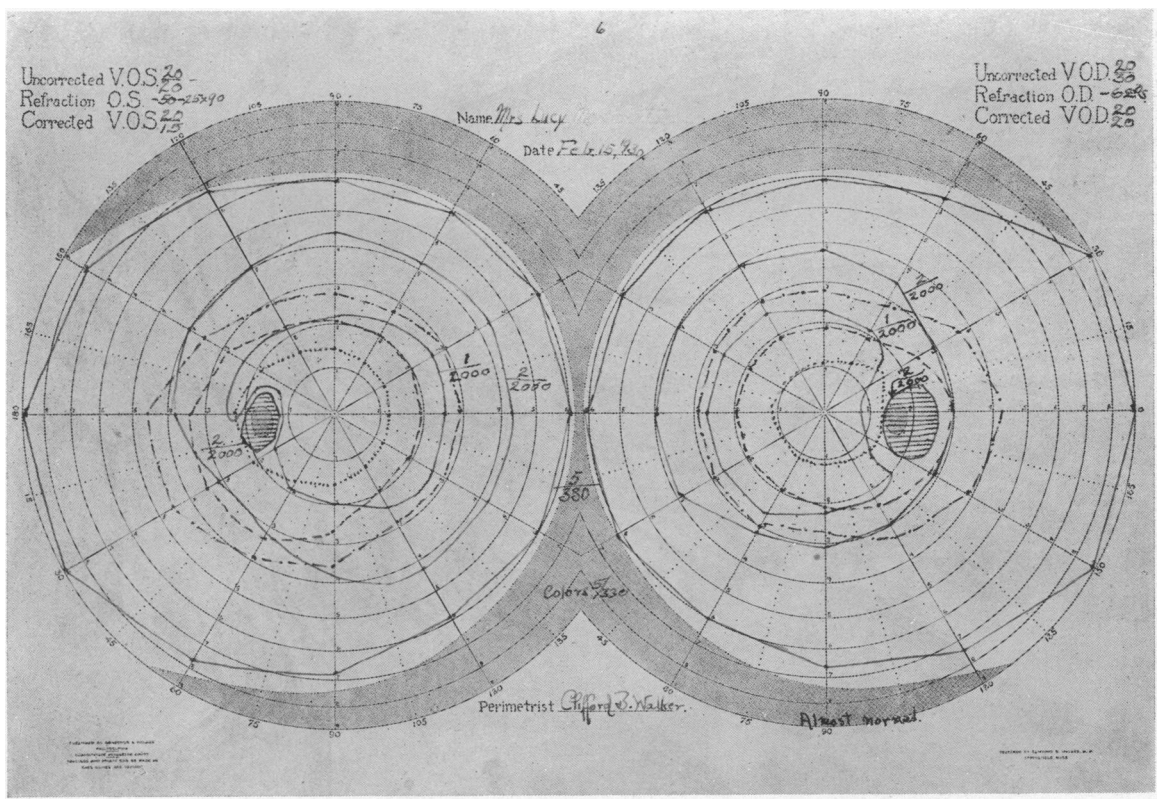

Fig. 6 (Case 1).—Retrobulbar neuritis, O. D. sixteenth month, vision is perfect as far as the patient is concerned, slight enlargement of blind spot and some alteration of both 1/2000 contours.

sary to complete the field series and hold the patient in the proper course.

With the first show or report of improvement in the field or central vision, perhaps at the second visit as in this case, the ophthalmologist feels more certain of his ground. In some cases I have even used Burnham's[14] combined pilocarpin series (one-twelfth grain to fourteen grains in a series of ten daily, afternoon, injections), since elimination should be helpful.

It has been noticed that the slower the progressive improvement the greater is the chance for some residual damage around the blind spot and occasionally centrally also, as compared with those whose return of vision is so rapid that long before any chance of atrophy sets in the field is again normal. In the concluding part of this paper instances of the more rapid form of recovery and of multiple sclerosis will be given.

(To be concluded.)

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THE SURGICAL TREATMENT OF DUODENAL AND GASTRIC ULCER*

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DISCUSSION *by Walter F. Wessels, M. D., Los Angeles; Clarence G. Toland, M. D., Los Angeles.*

THE results following surgical treatment of duodenal and gastric ulcer are best when care is exercised in the selection of cases and when the indications for surgery are most definite. In the absence of hemorrhage, perforation, obstruction, or gastric retention in cases of duodenal ulcer, the amount of disability and efficacy of medical management of the lesion are most important in determining whether or not the lesion is a surgical one. Many cases of duodenal ulcer of short duration will respond to medical treatment. Many others, where the symptoms and manifestations are sufficiently mild to produce little if any disability on medical and dietary management, are not surgical. In the absence of complications, all duodenal ulcers should be given the benefit of medical management, and only those manifesting repeated recurrence of symptoms, with subsequent partial or total disability, should be considered surgically. The complications of hemorrhage, perforation, or obstruction usually establish the urgency of surgical procedures. In general, it may be stated that somewhat less than 50 per cent of duodenal ulcers become surgical.

Surgeons are very prone, and properly so, to regard most gastric ulcers as surgical in the absence of contraindications to operation. Unquestionably, many gastric ulcers will heal under proper medical management. However, the relationship between gastric ulcer and carcinoma of the stomach cannot be denied. I have many times seen patients with carcinoma of the stomach who have had an antecedent history highly suggestive of ulcer. Whether or not there is any degree of agreement between surgeons, internists, and pathologists regarding the incidence of carcinoma developing upon an old gastric ulcer, it must be stated that the clinical differential diagnosis between a benign gastric ulcer and early carcinoma is not always easy and entirely accurate. There are many lesions of the stomach, as determined by clinical and roentgen examination, where only exploration and microscopic section will determine the accurate diagnosis. Whether or not gastric carcinoma is always a malignant lesion from its inception, or whether it may have developed on an old gastric ulcer, it is reasonable to suppose that most gastric carcinomas at some time have been no larger in their diameter than the usual gastric ulcer. The therapeutic test of differentiation has at times allowed an operable lesion to become inoperable during the period of observation.

I have recently reviewed the operative findings and surgical procedures in 933 cases of duodenal and gastric ulcer on my surgical service at the Mayo Clinic during the period from January 1, 1919 to May 30, 1930. There were 810 cases of duodenal ulcer and 123 cases of gastric ulcer, an incidence of 13 plus per cent of gastric ulcer—or one gastric ulcer to approximately six duodenal ulcers. The incidence of ulcer, according to sex, in this series was approximately the same: 82.7 per cent of duodenal ulcers, and 79.6 per cent of gastric ulcers occurred in the male. Intra-abdominal disease associated with duodenal and gastric ulcer is relatively common. That in the appendix was most frequently noted, occurring in 58 per cent of the patients with duodenal ulcer and in 43 per cent of the patients with gastric ulcer. Cholecystitis, usually with stones, was found associated with duodenal ulcer in forty-six

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